Please add the following new claims 9 and 10.

9. (New) The method as claimed in claim 3, further comprising the step of:

storing, by said database stores, for each system function regarded as being relevant to availability, information which describes conditions under which said availability of a system function is to be assessed as existing or no longer existing.

10. (New) The method as claimed in claim 4, further comprising the step of:

storing, by said database stores, for each system function regarded as being relevant to availability, information which describes conditions under which said availability of a system function is to be assessed as existing or no longer existing.

REMARKS

The present Amendment revises the specification and claims to conform to United States patent practice, before examination of the present PCT application in the United States National Examination Phase. Pursuant to 37 CFR 1.125 (b), applicants have concurrently submitted a substitute specification, excluding the claims, and provided a marked-up copy. All of the changes are editorial and applicant believes no new matter is added thereby. The amendment, addition, and/or cancellation of claims is not intended to be a surrender of any of the subject matter of those claims.

Early examination on the merits is respectfully requested.

Submitted by,

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Appendix A
Mark Ups for Claim Amendments

1. **(Amended)** A method of monitoring for availability of a system function in a computer system, [~~according to which~~]**comprising the steps of:**

[–]**storing, in** a database of [~~the~~]**said** computer system[~~-stores~~], for a system function monitored for availability, respective information which describes [~~the~~]conditions under which [~~the~~]**said** availability of a system function [~~is~~]**are** to be assessed as existing or no longer existing[,]**; and**

[~~the~~]**utilizing** [~~aforementioned~~]**said** information[~~-is used~~], when a change in [~~the~~]**a** state of a component of [~~the~~]**said** computer system has taken place or is intended **to take place**, to assess whether [~~this~~]**said change that has taken place** results**,** or **said change that is intended to take place** would result**,** in a change in terms of the availability of [~~the aforementioned~~]**said** system function.

2. **(Amended)** A method of monitoring for availability of a system function in a computer system, [~~according to which~~]**comprising the steps of:**

[~~a system function for monitoring for availability is prescribed by~~]marking**,** in a database of [~~the~~]**said** system[~~-the~~]**,** component mappers for[~~-the~~] components which contribute to [~~the~~]**said** availability of [~~the aforementioned~~]**said** system function[,]**; and**

[~~the component mappers~~]**utilizing said** marked [~~as such are used~~]**component mappers**, when a change in [~~the~~]**a** state of a component has taken place or is intended, to assess whether [~~this~~]**said change in state that has taken place** results**,** or **said intended change in state** would result**,** in a change in [~~the~~]**said** availability of [~~the aforementioned~~]**said** system function.

3. **(Amended)** A method of monitoring for availability of a system function in a computer system, [~~according to which~~][–]**comprising** the **steps of:**

recording a respective current [{]functional[}] state of a [{]system[}] component[~~-is recorded~~] for said [{]system[}] component in the database[,]**;**

[~~in addition, the~~]**recording, by said** database[~~-records~~], for each system component, whether said component contributes to [~~the~~]**said** availability of a system function monitored for availability, and, if so, for which system function or system functions[,] **said component contributes to said availability; and**

[–]**assessing,** when a change in [~~the~~]**a** state of a component of [~~the~~]**said** system has taken place or is intended, [~~the~~]**using** data stored in [~~the~~]**said** database for[~~ the~~] other system components [~~are used~~]to assess whether [~~the~~]**said** availability of a system function monitored for availability changes or would change as a result of [~~the~~]**such** [~~aforementioned~~]**a** change.

4. **(Amended)** A method of monitoring for availability of a system function in a computer system, [~~according to which~~]**comprising the steps of:**

[–]**marking, using** a stipulation regarding which system function is monitored for availability[~~ is used to mark~~], among [~~the~~]components of [~~the~~]**said** system which are mapped in [~~the~~]**a** database, those components which are necessary for [~~the~~]**said** availability of [~~the~~]**said** system function[~~,~~]**;**

[–]**marking,** in addition, [~~the~~]**a** respective state of [~~the~~]**said** components of [~~the~~]**said** system which are mapped in the database [~~is marked~~]for said components[~~,~~]**; and**

[–]**assessing,** when a change in [~~the state of~~]a component **state** has taken place or is intended, [~~an assessment is made of~~]whether [~~this~~]**said change** results or would result in a change in [~~the~~]availability of [~~the aforementioned~~]**said** system function.

5. **(Amended)** The method as claimed in [~~one of claims 2 to 4,~~]**claim 2, further comprising the step of:**

[~~characterized in that~~]

[~~the~~]**storing, by said** database stores, for each system function regarded as being relevant to availability, information which describes [~~the~~]conditions under which [~~the~~]**said** availability of a system function is to be assessed as existing or no longer existing.

6. **(Amended)** An availability monitoring component in a computer system, [~~which~~]**comprising:**

a database; and

system components wherein, when a change in [~~the~~]**a** state of [~~a component~~]**one** of [~~the~~]**said components of said** system has taken place or is intended, [~~uses~~]**said system assessing, using** information stored in [~~the~~]**said** database[~~ to assess~~]**,** whether [~~this~~]**said change in state** changes or would change [~~the~~]**an** availability of a system function, [~~where~~]**said database**, for this purpose, [~~the database indicates~~]**indicating** for each data map for a component whether [~~the~~]**a**

mapped component contributes to [~~the~~]**said** availability of a system function, and, if so, to which system function or system functions **contribute to said availability of a system function**.

7. **(Amended)** The availability monitoring component as claimed in claim 6, [~~characterized in that~~][~~the~~] **wherein said** availability monitoring component additionally makes [~~the aforementioned~~]**said** assessment **based** on [~~the basis of~~]particular conditions which are stored in [~~the~~]**said** database for each system function regarded as being relevant to availability.

8. **(Amended)** A computer system, [~~having~~]**comprising:**

[~~———~~]a [~~stipulation means which can stipulate~~]**stipulator that stipulates** for [~~the~~]**said** system which system function is to be monitored for availability[~~,~~]**;**

[~~———~~]a component map which, for a component, records in [~~the~~]**a** database whether said component is at all necessary for a system function monitored for availability and for which system function it is necessary, and which also records for [~~the~~]**said** component [~~the~~]**its** respective [~~(~~]functional[~~)~~] state**;** [~~thereof,~~]**and**

[~~———~~]an [~~assessment means~~]**assessor** which uses [~~the aforementioned records~~]**said data recorded in said database** made in a component map to assess whether a change in [~~the~~]**a** state of a component which has taken place or is intended **to take place** has resulted or would result in a change in [~~the~~]**an** availability of [~~the aforementioned~~]**said** system function.

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Marked Up Substitute Specification

[~~Description~~]**SPECIFICATION**

TITLE

METHOD OF MONITORING FOR AVAILABILITY OF A SYSTEM FUNCTION IN A COMPUTER SYSTEM

BACKGROUND OF THE INVENTION

[~~Method~~]**Field** of **the Invention**

The invention relates to a method and respective component and system for monitoring [~~for~~]**the** availability of a system function **when a change** in **the state of** a [~~computer~~]**component of the** system **has taken place or is intended.**

Description of the Related Art

[~~To date~~]**Previously**, digital switching systems (e.g.**,** the systems EWSD and EWSX from Siemens AG) contained no function which monitored particular functionalities distributed over a large number of **hardware (**HW**)** units (platforms). This created the following technical problems:

- If HW units were no longer active on account of errors (**hardware** HW or **software** SW), the operator himself had to deduce which functionalities of the system had been lost.

- Routine tests on HW units meant that there was the possibility that particular functionalities were no longer available, since HW units were automatically disconnected during routine tests.

- An operator was able to deactivate HW units without receiving any indication of which functionalities of the system would be lost as a result of the deactivation.

Of the problems indicated above, only the first has been partially solved:

- Detection of whether a particular functionality is not available in the system was provided exclusively during the startup phase (in EWSD: adjudgement of #7 total failure).

- Upon adjudgement of #7 total failure, **initiation of** a recovery escalation[~~is initiated~~].

Drawbacks of this solution:

During normal operation, there is, to date, no direct adjudgement of or monitoring for loss of an important system function.

There is also no predictive assessment of whether a fundamental system function will be lost on account of an HW configuration.

SUMMARY OF THE INVENTION

The invention is based on the object of overcoming the aforementioned drawbacks.

This object is achieved by a method [~~in accordance with claim 1.~~]**of monitoring for availability of a system function in a computer system, comprising the steps of storing, in a database of said computer system, for a system function monitored for availability, respective information which describes conditions under which said availability of a system function are to be assessed as existing or no longer existing; and utilizing said information, when a change in a state of a component of said computer system has taken place or is intended to take place, to assess whether said change that has taken place results, or said change that is intended to take place would result, in a change in terms of the availability of said system function.**

According to the invention, an arbitrary system functionality indicated by the network operator is mapped in the database using the data types and the loading types of the HW units. The mapped data are provided with a functional state, are maintained and are assessed on the basis of the system state (including predictively).

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in more detail below with reference to the [~~drawing, the drawing comprising two figures~~]**drawings**.

[~~FIGURE 1 shows~~]**Figure 1 is a block diagram showing** a general association between data types and HW units[~~.~~]**; and**

Figure 2 is a data structure diagram illustrating data types that~~The data types listed above~~ **may be available on various HW units MP-Dep**~~, for example, as shown in FIGURE 2.~~**.**

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 illustrates the entire system having a functionalities in subsystem 1 (with data types A and B) and subsystem 2 (with data types C and D). Platform x is shown having both data types A and B, and platforms y and z having only data type A and B respectively.

The following (operator-related) data types exist on the systems EWSD and EWSX:

- CALLP (Data for call processing operations)
- CM (Data for call processing operations)
- SLT (Data for #7 signaling and other signaling types)
- SM (Data for #7 signaling)
- PNNI (Data for private networks)
- MN (Data for mobile radio)
- PD (Data for mobile radio)
- LIC (Data for a line termination)

[~~The data types listed above~~][~~ may be available on various HW units MP-Dep~~][~~, for example, as shown in FIGURE 2.~~]

Examples are illustrated in Figure 2.

In addition to the data types mentioned, the loading type of an HW unit determines whether or not [~~said~~]**this** HW unit is relevant in the context of total

failure. Thus, by way of example, the data type SLT is used on the basis of its loading type, **i**.[~~That is to say~~]**e.,** all MP-Deps having the data type SLT hold the same data. The loading type is used to decide which processes ultimately access these data and process them.

The combination of data type and loading type stipulates what functionality is provided by a particular HW unit. Thus, an MP-Dep having the data type SLT may or may not be relevant to #7 signaling, depending on the loading type. [~~For the purposes of simpler illustration~~]**To illustrate more simplistically**, the designation #7-SLT is used below when the loading type of the MP-Dep means that it is relevant to #7 signaling. Otherwise, just the designation SLT is used.

If, by way of example, the system functions "call processing" and "#7 signaling" have now been assessed as being relevant in the context of total failure, the check on the availability of the call processing functionality needs to be assured of the availability of at least one MP-Dep from the set [MP-Dep 1x and MP-Dep 2x] in the example in [~~FIGURE~~]**Figure** 2. For the #7 functionality, the MP-Deps 1x, 2x and the MP-Dep 40 need to be checked.

Since the network operator would usually wish to define the instant at which system functions are to be assessed as relevant to failure, the aforementioned check must be of flexible design. This is achieved as follows:

- The components (HW units) of the system are mapped in the database,

- for a mapped component, a respective record is made of whether, on the basis of its data and loading type, [~~said~~]**this** component is necessary for one or more system functions which are relevant in the context of failure (the details required for making the aforementioned record can be prescribed by a network operator, for example),

- for a component mapped in this way, an additional record is made of the instant (e.g., during startup, after startup, or at any time) at which [~~said~~]**this** component is necessary (the details required for making the aforementioned record can likewise be prescribed by a network operator),

- for each system function, the minimum number of the mapped components which [~~is~~]**are** needed to maintain this very system function is also stipulated,

- for a mapped component, its respective (functional) state is also recorded, i.e., whether or not it is active,

- this state (active/not active) is maintained by the maintenance SW already existing for this purpose,

- any change in a state is reported to [~~the~~]**a** total failure detection unit,

- in this context, this report may be sent before or after a change in a state,

- if this report is sent before the change in a state (e.g., if an operator wants to deactivate components, e.g., HW units, or if a routine test is to be carried out), the total failure detection unit assesses whether deactivating a particular component would result in a particular system function being lost, and notifies the report originator (e.g., maintenance SW, etc.) of this fact,

- if this message is sent after the change in a state (e.g., when a component fails), the total failure detection unit assesses whether deactivation of a unit has caused a particular system function to be lost. The result of this assessment is forwarded to the report originator (e.g., protective SW),

- the report originator can now react in the manner which it deems appropriate (alarm, rejection of the operator order, rejection of the routine test (which would result in the unit being disconnected), repetition of startup, etc.).

[~~Abbreviations used:~~]

[~~HW: Hardware~~]

[~~MP-Dep: HW unit~~]

[~~SW: Software~~]

The above-described method and component are illustrative of the principles of the present invention. Numerous modifications and adaptations will be readily apparent to those skilled in this art without departing from the spirit and scope of the present invention.

Abstract

[~~Method~~][~~of monitoring for availability of a system function in a computer system~~]

To date, digital switching systems **have** contained no function which monitored particular system functions distributed over a large number of different [~~HW~~]**hardware** units.[~~According to the~~] **The** invention[~~,~~] **maps** any desired system function indicated by the network operator [~~is now mapped~~]in the database using the data types and the loading types of the [~~HW~~]**hardware** units. The mapped data are provided with a functional state, are maintained, and are assessed on the basis of the system state (including predictively).

[~~Figure 1~~]